

A³ ~~10¹~~ (Amended) 17. A method of making an optical fiber preform, comprising the steps of: prior to drawing optical fiber from the preform in a draw furnace, heating a tip of the preform in a pregobbing heating furnace separate from the draw furnace to form a pre-optimized draw tip on the preform having a tip taper with a ratio, defined as tip length divided by radius change over the tip length, of between about 5 to about 12, and causing a temperature profile of the pregobbing furnace to be substantially equal to a temperature profile of the draw furnace.

Please cancel claim 18 without prejudice or disclaimer.

A⁴ ~~10²~~ (Amended) 19. The method of claim 17 wherein the pre-optimized draw tip includes a tip taper having a ratio, defined as tip length divided by radius change across the tip length, of between about 6 to about 9.

Remarks

In view of the above amendments and the following remarks, favorable reconsideration of the outstanding office action is respectfully requested.

Attached hereto is a page entitled "Version of Markings to Show Changes Made."

Claims 10, 12-17 and 19-22 remain in this application. Claims 10, 12-17 and 19 have been amended. No new claims have been added. Claims 1-9 have been withdrawn from consideration, without prejudice. Claims 11 and 18 have been cancelled.

1. Drawings

Six (6) sheets formal drawings and Letter to the Official Draftsperson are enclosed herewith for Examiner's review and approval.

2. Election/Restriction

Applicants hereby affirm the provisional election without traverse made on July 2, 2002 wherein Applicants elected to prosecute the invention of Group I, claims 10-22.

3. Specification

The Examiner has objected to the specification because the terms "induction heating apparatus" and "induction heater" cannot be found in the specification. Examiner is directed to the Summary of the Invention on page 3, line 8-12 of the specification including such terms. Further, Applicants have added the term "induction heater" to the paragraph starting

on page 6 and ending on page 7. An "induction heater" includes an inductor and susceptor, as is known to those of ordinary skill in the art. A brief description has been added to this paragraph by amendment (see above). No new matter has been added. Elsewhere in the claims, the term "induction heating apparatus" has been replaced with "induction heater." Consequently, the objection to the specification should now be withdrawn.

4. § 112 Rejections

The Examiner has rejected claims 13-14 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 13 and 14 are amended to include the language that clarifies the ratio. For clarity, the ratio is as follows:

$$\text{Ratio} = (\text{tip length})/(\Delta \text{ Radius over the tip length}).$$

This Ratio is between 5 and 12; more preferably between 6 and 9.

Claims 13-14 have been amended to clarify the definition of the ratio. As such, it is believed that the 112, second para. rejection should be withdrawn.

5. § 103 Rejections

The Examiner has rejected claims 10-16 and 21-22 under 35 U.S.C. § 103 as being unpatentable for obviousness over U.S. Patent No. 5,970,750 (Humbert). The Examiner asserts that Figure 3 of Humbert and the associated text discloses the invention.

In response, Humbert is directed to an entirely different problem. Humbert discloses a method for surface treating a preform in a lathe with a plasma torch. At the end of the process, the end of the soot preform is removed by a separation step. As amended, nothing in Humbert teaches or suggests that the tip-shape should be pre-optimized, or that the temperature profile of the preforming apparatus be substantially identical to that of the draw furnace. Moreover, the Humbert device is a lathe not a furnace. Further, what Humbert shows is a blunt tip shape. The tip is by no means pre-optimized. In fact, given the approximate blunt tip shape shown in Humbert, one would encounter significant draw downtime before the tip could become of the shape where fiber may be drawn therefrom. This is exactly what Applicant's invention has addressed, that is, providing a pre-optimized tip shape such that draw disruptions are avoided. Thus, the practice of Humbert would frustrate the purpose of the present invention. Further, as amended, the heating furnace in claim 10 must include a chamber. None of these meaningful limitations are taught or

suggested by Humbert. As such, Claim 10 is not rendered obvious by Humbert and Applicant's request withdrawal of the §103 rejection. Claims 12-16 are allowable for at least these reasons. Claim 11 has been cancelled.

Claim 21 is allowable because there is no teaching or suggestion in Humbert to provide a plurality of pregobbing apparatus having heating furnace with a first temperature profile substantially equal to the second profile of the draw furnace and wherein a pre-optimized shape preform tip is provided. First, Humbert teach a lathe, not a furnace. Respectfully also, Examiner is taking too broad of a view of the term pre-optimized tip shape. The tip shape can't be pre-optimized as shown in Humbert as fiber cannot be drawn therefrom until the shape changes to a "tapered shape" otherwise, the benefits of the invention, i.e., fiber draw time cannot be reduced. Thus, as described on page 6, line 12-16 the tip cannot be pre-optimized unless the time to commence draw can be dramatically reduced. Also, as described in page 6, line 16-17, the tip must be formed to the proper shape with most or all of the trash glass removed. Examples of ratios of 5-12 are give by way of preferred dimensions. Further evidence is shown in Fig. 3 which describes an un-pregobbed shape. Humbert shows a shape even more blunt than that of the un-pregobbed shape. Neither of the requirements to be considered "pre-optimized" nor the preferred dimensions are met by Humbert. Thus, Humbert is clearly not a "pre-optimized" tip shape. Therefore, claim 21 is allowable as drafted. Claim 22 is allowable for at least the above reasons.

The Examiner has further rejected claims 17-19 as being unpatentable over U.S. Patent No. 5,152,818 (Berkey). The Examiner asserts that the invention is disclosed at col. 7, lines 25-30 of Berkey. By its very discussion, no pregobbing is taking place in Berkey, as Col. 7 line 25 indicates that the gob is dropped in a draw furnace, not a pregobbing furnace. Further, as amended, the limitations of claim 18 are included. Therefore, the rejection of claim 17 is traversed. Claim 18 is cancelled.

The Examiner has further rejected claim 20 as being unpatentable over U.S. Patent No. 5,970,750 (Humbert), in view of U.S. Patent Number 5,059,229 (Blankenship) or U.S. Patent No. 5,897,681 (Lysson). Blankenship nor Lysson can overcome the deficiencies in Humbert, i.e., that it does not teach or suggest a pre-optimized tip shape, that it is not a furnace but is a lathe, and that there is no teaching or suggestion that the temperature profiles be substantially equal. As such, the combination cannot render the present invention obvious. Therefore, the 103 rejection of claim 20 should be respectfully withdrawn.

6. Unconsidered References

It is Applicants belief that several cited references have apparently not been considered by the Examiner. Applicants have included herewith copies of the PTO-1449 forms previously submitted and request Examiner to initial same and return with the next office communication thereby indicating that they have been considered.

7. Conclusion

Based upon the above amendments, remarks, and papers of record, Applicant believes the pending claims of the above-captioned application are in allowable form and patentable over the prior art of record. Applicant respectfully requests reconsideration of the pending claims 10, 12-17 and 19- 22 and a prompt Notice of Allowance thereon.


Applicant believes that no extension of time is necessary to make this Response timely. Should Applicant be in error, Applicant respectfully requests that the Office grant such time extension pursuant to 37 C.F.R. § 1.136(a) as necessary to make this Reply timely, and hereby authorizes the Office to charge any necessary fee or surcharge with respect to said time extension to the deposit account of the undersigned firm of attorneys, Deposit Account 03-3325.

Please direct any questions or comments to Randall S. Wayland at (607) 974-0463.

Respectfully submitted,

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Date: 10-9-02


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VERSION OF MARKINGS TO SHOW CHANGES MADE

Please replace the para. starting on page 6 and ending on page 7 with the following revised paragraph:

The pregobbing heating furnace 24, as best illustrated in Fig. 4, has an induction heater with an induction coil 62 and a susceptor 64. The furnace 24 further includes a cylindrical heating chamber 28, heat insulation 30 surrounding the heating chamber, and and the induction coil 62 surrounding the susceptor 64, chamber and preform 22 and providing a hot zone 60 for heating the leading tip 32 of the preform 22. The induction coil, size and shape of the chamber, and insulation provided are such that the temperature profile of the pregobbing furnace 24 adjacent the tip is substantially identical to that of the draw furnace 42 (Fig. 6). This is accomplished in practice by having the internal components of the furnace be identical and adjusting the temperature controls for any slight differences.

In the Claims

Please amend the claims as follows:

(Amended) 10. A method for manufacturing an optical fiber preform, comprising the steps of:

- d) heating a consolidated optical fiber preform within a[n induction] chamber of a heating furnace [apparatus] having a first temperature profile to allow a gob to drop under the influence of heat and gravity,
- e) removing additional glass from the preform in the heating furnace until a draw tip having a pre-optimized tip shape is formed, and
- f) transferring the preform to a draw furnace of a draw apparatus wherein a second temperature profile within the draw furnace is substantially identical to the first temperature profile.

11. ~~The method of claim 10 further comprising exposing the preform to a second temperature profile within the draw furnace substantially identical to the first profile.~~Cancelled

(Amended) 12. The method of claim 10 wherein the step of heating is accomplished by at least one induction [heater] coil surrounding the preform.

(Amended) 13. The method of claim 10 wherein the pre-optimized shape includes a tip taper having a ratio, defined as [of] tip length divided by [to] radius change [along] over the tip length, of between about 5 to about 12.

(Amended) 14. The method of claim 10 wherein the pre-optimized shape includes a tip taper having a ratio, defined as [of] tip length divided by [to] radius change [along] over the tip length, of between about 6 to about 9.

(Amended) 15. The system of Claim 10 wherein the **[induction]** heating furnace [apparatus] includes a temperature between about 1800 °C and 2000 °C.

(Amended) 16. The system of Claim 10 wherein the **[induction]** heating furnace [apparatus] includes a temperature between about 1900 °C and 1950 °C.

(Amended) 17. A method of making an optical fiber preform, comprising the steps of:
prior to drawing optical fiber from the preform in a draw furnace, heating a tip of the preform in a pregobbing heating furnace separate from the draw furnace to form a pre-optimized draw tip on the preform having a tip taper with a ratio, defined as tip length divided by radius change over the tip length, of between about 5 to about 12, and causing a temperature profile of the pregobbing furnace to be substantially equal to a temperature profile of the draw furnace.

18. ~~The method of claim 17 wherein the pre-optimized draw tip includes a tip taper having a ratio of tip length to radius change along the tip length of between about 5 to about 12. Cancelled~~

(Amended) 19. The method of claim 17 wherein the pre-optimized draw tip includes a tip taper having a ratio, defined as [of] tip length [to] divided by radius change [along] across the tip length, of between about 6 to about 9.

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